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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/766,228 | 01/26/2004 | Shilin Chen | 074263.0210 (SC-98-025 C3 | 2924 |

31625 7590 10/09/2007

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| EXAMINER | |
|---|---|
| JONES, HUGH M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2128 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 10/09/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/766,228 | CHEN, SHILIN | |
| | Examiner | Art Unit | |
| | Hugh Jones | 2128 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *5/8/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *1.105 requirement*.

## DETAILED ACTION

1. Claims 1-5 of U. S. Application 10/766,228, filed on 1/26/2004 are pending. This action is in response to the 1/26/2004 filing and in response to Applicant's submissions filed 1/26/2004, 9/8/2004, 12/15/2004, 1/31/2005, 5/23/2005, 6/13/2005, 6/29/2005, 3/17/2006, 4/28/2006, 7/11/2006, 8/23/2006, and to Applicant's response of 5/8/2007.

### ***Drawings***

**2. Figures 10-12 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated.** See MPEP § 608.02(g). Figure 10 discloses a prior art drill rig; figure 11 discloses a prior art roller cone bit; figure 12 discloses a prior art drag bit. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**4. Claims 1-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5. "Lateral" is used interchangeably to characterize forces on the *bit*, *roller cone* on the bit or the *cutting elements* on the roller cone.

> 1. A method for optimizing a design of a roller cone drill bit, comprising: simulating the bit drilling through a selected earth formation; adjusting at least one design parameter of the bit; repeating the simulating the bit drilling; and repeating the adjusting and the simulating until a **lateral force** on the bit is optimized.
>
> 2. A method for balancing **lateral forces** on a plurality of roller cones on a roller cone drill bit during drilling, comprising: (a) calculating, from a geometry of cutting elements on each of the roller cones and an earth formation to be drilled by the bit, a **lateral force** on each of the cutting elements; (b) simulating incrementally rotating the bit and recalculating the **lateral force** on each of the cutting elements; (c) repeating the simulating incrementally rotating and recalculating for a selected number of incremental rotations; (d) combining the **lateral force** on the cutting elements on each one of the roller cones to determine the **lateral force** on each of the roller cones; (e) adjusting at least one bit design parameter and repeating (a) through (d); and (f) repeating (e) at least until a difference between the **lateral force** on each of the roller cones is less than the difference between the **lateral force** on each of the roller cones determined prior to the adjusting the at least one bit design parameter.

"Lateral" as in *lateral force* (recited in all independent claims) is simply not recited in the detailed description. Although the term is recited in the original claims, it is not defined in the specification and its definition cannot be determined from the claims. It is noted that bit, roller cone and cutting elements are complex three-dimensional structures. There are a multitude of forces acting on all surfaces of the structures. It is not clear which forces are "lateral" with respect to each surface.

6. The only recitation of "lateral" in the specification is:

> [0042] The drill bit has decreased axial and lateral operating vibration.

> [0029] … For example, the best solution available for dealing with the problems of lateral vibration, is a recommendation that roller cone bits should be run at low

to moderate rotary speeds when drilling medium to hard formations to control bit vibrations and prolong life, and to use downhole vibration sensors. (Dykstra, et al, EXPERIMENTAL EVALUATIONS OF DRILL STRING DYNAMICS, Amoco Report Number F94-P-80, 1994)."

7. Claim 2 recites:

2. A method for **balancing lateral forces** on a plurality of roller cones on a roller cone drill bit during drilling, comprising: (a) calculating, from a geometry of cutting elements on each of the roller cones and an earth formation to be drilled by the bit, a lateral force on each of the cutting elements; (b) simulating incrementally rotating the bit and recalculating the lateral force on each of the cutting elements; (c) repeating the simulating incrementally rotating and recalculating for a selected number of incremental rotations; (d) combining the lateral force on the cutting elements on each one of the roller cones to determine the lateral force on each of the roller cones; (e) adjusting at least one bit design parameter and repeating (a) through (d); and (f) repeating (e) at least **until a difference** between the lateral force on each of the roller cones **is less than the difference** between the lateral force on each of the roller cones determined prior to the adjusting the at least one bit design parameter.

However, this does not constitute actually balancing the forces, because, by definition, balancing the forces means that the forces are equal.

8. Pages 21-22 of the specification mention six possible embodiments but provide no substantial detail other then a mere listing of steps. It is also noted that the "means

for" language in the specification (line 7, page 18 – "performing an ***optimization means***") appears to be an improper attempt at incorporation by reference.

**9. Claims 1-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

10. "Lateral" as in lateral force (recited in all independent claims) is simply not recited in the detailed description. Although the term is recited in the original claims, it is not defined in the specification or by the claims. It is noted that bit, roller cone and cutting elements are complex three-dimensional structures. There are a multitude of forces acting on all surfaces of the structures. It is not clear which forces are "lateral" with respect to each surface.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**12. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

13. Claim 1 recites lateral *forces being optimized.* The forces are determined by the interaction of the bit with the earth. Furthermore, there is no criterion for "optimized". It appears from the specification, that *drill bit parameters are optimized* when the lateral *forces are balanced.*

## ***Claim Interpretation***

14. The subsequent prior art rejections are asserted in view of the following claim analysis.

15. The claims do not invoke 112(6) paragraph ("means for" or "step for"). This follows from analysis of the claims and from Applicant's statement in the last paragraph of the specification:

> "None of the description in the present application should be read as implying that any particular element, step, or function is an essential element which must be included in the claim scope: THE SCOPE OF PATENTED SUBJECT MATTER IS DEFINED ONLY BY THE ALLOWED CLAIMS. Moreover, none of these claims are intended to invoke paragraph six of 35 USC section 112 unless the exact words "means for" are followed by a participle."

## ***Claim Rejections - 35 USC 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**18. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over [Ma et al. ("The computer simulation of the interaction between roller bit and rock" – 1995 – *of record*) or Ma ("The operational mechanics of the rock bit" – 1996 - *of record*)] in view of [Warren et al. US Patent Re 34,435 – of record] and in further view of [Applicant's Own Admission].**

19. Ma et al. ("The computer simulation of the interaction between roller bit and rock" – 1995 – *of record*) discloses:

***optimal roller bit design using computer simulation*** (entire paper);

***operational mechanics of the roller bit geometry*** ("The model of bit and bottom"; "roller bit"; "bottom hole");

***kinematics of the bit*** ("The model of bit and bottom"; rotation angle of cone"; "The simulation of interaction");

***rock-bit interaction*** and crater analysis ( "crater model"; "Interaction between bit and rock");

***bit design including force analysis*** ("The simulation of Interaction").

20. Ma ("The operational mechanics of the rock bit" – 1996 - *of record*) discloses:

***optimal roller bit design using computer simulation*** (chapter 6) based on the entire teachings in the book, including

***operational mechanics of the roller bit geometry*** (details in chapter 2);

***kinematics of the bit*** (details in chapter 3);

***rock-bit interaction*** (details in chapter 5); and

***bit design including force analysis*** (see page 232: "evaluate the size, load, motion, stress, and strain of each part...").

**21. Ma et al. (1995) or Ma et al. (1996) do teach optimal design but do not *expressly* teach that the optimal design consists of** balancing the lateral forces;

22. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the teachings of Ma et al. to consider as optimal design such a design wherein the forces and volumes are balanced on drill bits and further to maximize the drill rate for the following reasons. It was well known in the art at the time of the invention to those of ordinary skill in the art that a pervasive problem in the industry was that of unbalanced forces on bits resulting in drill bit whirl further resulting in a decrease of drill penetration rate.

23. Warren et al. disclose ***teach that the issues relating to bit imbalance were well known and studied in the prior art for at least the last decade***. Warren et al. further teach the dependence of drill penetration rate on relative force balance.

In particular, note col. 1, line 28 to col. 2, line 21:

> "*Numerous studies have been made to find out what causes such destruction to the cutting elements.* The inventors hereof have previously found that *a substantial portion of the destructive forces are generated by radial imbalance forces that cause a drill bit to rotate about a rotational axis offset from the geometric center of the drill bit in such a way that the drill bit tends to wobble or "backwards whirl" about the borehole. This backwards whirling causes the center of rotation to change dramatically as the drill bit rotates*

*about the borehole. Thus, the cutting elements travel faster, sideways, and backwards and thus are subject to greatly increased impact loads which cause the destruction of the cutting elements.*

More specifically, *circumferential drilling imbalance forces exist to some degree on every drill bit and these forces tend to push the drill bit towards the side of the borehole. In a typical drill bit, gauge cutting elements are designed to cut the edge of the borehole. During the cutting process, the effective friction between the cutting elements near the gauge area increase and, thus, the instantaneous center of rotation becomes some point other than the geometric center of the drill bit. When this happens, the usual result is for the drill bit to begin to backwards whirl around the borehole.* This whirling process regenerates itself because sufficient friction is always generated between the drill bit gauge area and the borehole wall, no matter what the orientation of the drill bit, from the centrifugal forces generated by the rapid acceleration of the drill bit.

*Various methods and equipment have been proposed to eliminate or reduce these imbalance forces, including using dynamically balanced lower drill string assemblies and very precisely aligning the cutting elements to reduce imbalance forces.*

*Various designs of drill bits have been developed to improve penetration rates by aligning the cutting elements in a plurality of equal radius sets, with each set being in overlapping radial relationship.* One such drill bit design is disclosed in U.S. Pat. No. 4,545,441. Further, various attempts at improving cutting element life have been made by varying the back or side rake or angle of attack of the cutting elements, i.e., the angle at which the face of the cutting element addresses the formation with respect to the formation surface. The benefits of varying such back rake angles are disclosed in "The Effect Of Back Rake On The Performance Of Small-Diameter Polycrystalline Diamond Rock Bits: ANOVA Tests," Journal of Energy Resources Technology, Vol. 108, No. 4, pp. 305-309, December 1986; U.S. Pat. No. 4,660,659; U.S. Pat. No. 4,440,247; U.S. Pat. No. 4,186,628 and U.S.S.R. Pat. No. 395,559. The effects of varying side rake angles is disclosed in Hunnj SPE-10152 (1981).

> There is no disclosure or suggestion in any of the above-identified article or patents of arranging cutting elements specifically to prevent or reduce the effects of destructive bit whirl. ***There is a need for a drill bit design which incorporates features designed specifically for preventing bit whirl and improving cutting element life.***"

Thus, It would have been obvious to one of ordinary skill in the art at the time of the invention was to modify the teachings of Ma et al. to consider as optimal design such a design wherein the forces and volumes are balanced. There is a direct and inherent (as well as obvious) relationship between energy, drill rate, applied force and resultant removed volume of formation. This follows from Newton's laws of motion. This inherent relationship has also been recognized by Applicants when they admit (lines 4-11, page 20, specification) that:

> "*The geometric parameters of the roller cone bit are then modified such that the* ***volume of formation removed*** *by each cutting structure is* ***equalized.*** ***Since the amount of formation removed by a cutting structure is a function of the force imparted on the formation by the tooth, the volume of formation removed by a cutting structure is a direct function of the force applied to the cutting structure. By balancing the volume of formation removed by all cutting structures, force balancing is also achieved.***"

24. Removal of equal volumes of formation means that the lateral forces are balanced. Furthermore, balanced lateral forces are a consequence of balanced axial forces.

25. Regardless, nothing inventive has been produced by balancing lateral forces for a particular design via *routine testing* (optimization) of a design.

26. The court (*Pfizer v. Apotex F.3d (Fed. Cir. 2007)),* referring to *Dystar,* distinguished 'routine testing' from *the work of an inventor*:

> *"The experimentation needed, then, to arrive at the subject matter claimed in the...patent was nothing more than routine application of a well-known problem solving strategy and, we conclude, the work of a skilled artisan, not of an inventor." (internal citation and quotations omitted) (citing Dystar).*

27. The court characterized *the phamacopoeia- and compendium- guided work of the Plaintiff-Appellee as 'routine testing' conducted to merely verify an expectation of success in contrast to 'trial and error procedures' that support true discovery.*

28. The *act of designing* a bit indicates an *expectation of a successful design.*

29. The court further characterized Pfizer's 'routine testing' efforts as merely "verification testing...to ease its commercial manufacturing and marketing of the tablet form of the therapeutic [composition]," the Court quoted the language from *Dystar* that refers to the existence of an *implicit motivation to combine* when the efforts are aimed at creating a product that is more desirable because it is "stronger, cheaper, cleaner, etc." (emphasis added):

> *"At most, then, Pfizer engaged in routine, verification testing to optimize selection of one of several known and clearly suggested pharmaceutically-acceptable salts to ease its commercial manufacturing and marketing of the tablet form of the therapeutic amlodipine. Creating a "product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more **durable**, or more **efficient** . . . to enhance commercial opportunities . . . is universal—and even common-sensical." (emphasis added) (citing Dystar).*

30. It would have also been obvious to a person of ordinary skill in the art at the time of the invention to simulate the interaction of a bit with the earth because it is recognized that use of a known technique (namely simulating the interaction of a bit with earth) to improve a similar apparatus *(drill bit)* in the same way is not sufficient to distinguish over the prior art.

31. One of ordinary skill in the art could have applied the known "improvement" technique in the same way to the "base" device and the results would have been predictable to one of ordinary skill in the art.

32. Applicants have not invented the simulation of bits, and have merely applied a known technique to improve a bit in the same way. The improvement is nothing more than the predictable use of known techniques to the prior art elements.

33. It would have been obvious to one of ordinary skill in the art at the time of the invention that a method of enhancing a particular class of apparatus was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in other situations. One attempting to design an optimal bit would naturally simulate the interaction between the bit and earth to see which parameters lead to the optimal solution.

34. One of ordinary skill in the art would have been capable of applying known methods of simulating the interaction of roller cone bits with earth (Ma et al., for example) to the design of the bits and the results would have been predictable to one of ordinary skill in the art. The Supreme Court in KSR noted that "if the actual application of the technique would have been beyond the skill of one of ordinary skill in the art, then using the technique would not have been obvious."

35. Applicants have admitted that the problem was known in the art:

> "[0029] Though numerical methods are now available to model the bottom hole pattern produced by a roller cone bit, there is no suggestion as to how this should be used to improve the design of the bits other than to predict the presence of obvious problems such as tracking. For example, the best solution available for dealing with the problems of lateral vibration, is a recommendation that roller cone bits should be run at low to moderate rotary speeds when drilling medium to hard formations to control bit vibrations and prolong life, and to use

downhole vibration sensors. (Dykstra, et al, EXPERIMENTAL EVALUATIONS OF DRILL STRING DYNAMICS, Amoco Report Number F94-P-80, 1994)."

36. Applicants admit that it was known to take into consideration the interaction between bit and earth when designing bits and to change the bit parameters to optimize the interaction:

"[0019] The design of the component elements in a rock bit are interrelated (together with the size limitations imposed by the overall diameter of the bit), and some of the design parameters are driven by the intended use of the product. For example, cone angle and offset can be modified to increase or decrease the amount of bottom hole scraping. Many other design parameters are limited in that an increase in one parameter may necessarily result in a decrease of another. For example, increases in tooth length may cause interference with the adjacent cones."

37. Applicants admit that the motivation to study the problem exists:

"[0025] The economics of drilling a well are strongly reliant on rate of penetration. Since the design of the cutting structure of a drill bit controls the bit's ability to achieve a high rate of penetration, cutting structure design plays a significant role in the overall economics of drilling a well."

"[0026] It has long been desirable to predict the development of bottom hole patterns on the basis of the controllable geometric parameters used in drill bit design, and complex mathematical models can simulate bottom hole patterns to a limited extent. To accomplish this it is necessary to understand first, the relationship between the tooth and the rock, and second, the relationship between the design of the drill bit and the movement of the tooth in relation to the rock. It is also known that these mechanisms are interdependent."

38. Applicants admit that it was known to simulate the interaction;

"[0027] To better understand these relationships, much work has been done to determine the amount of rock removed by a single tooth of a drill bit. As can be seen by the forgoing discussion, this is a complex problem. For many years it has been known that rock failure is complex, and results from the many stresses arising from the combined movements and actions of the tooth of a rock bit. (Sikarskie, et al, PENETRATION PROBLEMS IN ROCK MECHANICS, ASME Rock Mechanics Symposium, 1973). Subsequently, work was been done to develop quantitative relationships between bit design and tooth-formation interaction. This has been accomplished by calculating the vertical, radial and tangential movement of the teeth relative to the hole bottom, to accurately

> represent the gouging and scrapping action of the teeth on roller cone bits. (Ma, A NEW WAY TO CHARACTERIZE THE GOUGING-SCRAPPING ACTION OF ROLLER CONE BITS, Society of Petroleum Engineers No. 19448, 1989). More recently, computer programs have been developed which predict and simulate the bottom hole patterns developed by roller cone bits by combining the complex movement of the teeth with a model of formation failure. (Ma, THE COMPUTER SIMULATION OF THE INTERACTION BETWEEN THE ROLLER BIT AND ROCK, Society of Petroleum Engineers No. 29922, 1995). Such formation failure models include a ductile model for removing the formation occupied by the tooth during its movement across the bottom of the hole, and a fragile breakage model to represent the surrounding breakage."
>
> "[00028] Currently, roller cone bit designs remain the result of generations of modifications made to original designs. The modifications are based on years of experience in evaluating bit run records and dull bit conditions. Since drill bits are run under harsh conditions, far from view, and to destruction, it is often very difficult to determine the cause of the failure of a bit. Roller cone bits are often disassembled in manufacturers' laboratories, but most often this process is in response to a customer's complaint regarding the product, when a verification of the materials is required. Engineers will visit the lab and attempt to perform a forensic analysis of the remains of a rock bit, but with few exceptions there is generally little evidence to support their conclusions as to which component failed first and why. Since rock bits are run on different drilling rigs, in different formations, under different operating conditions, it is extremely difficult draw conclusion from the dull conditions of the bits. As a result, evaluating dull bit conditions, their cause, and determining design solutions is a very subjective process. What is known is that when the cutting structure or bearing system of a drill bit fails prematurely, it can have a serious detrimental effect of the economics of drilling."

39. The specification states that the invention resides in balancing forces (lateral or axial). Clearly, if forces on the bit are not balanced, the cutting efficiency of the bit will be diminished. Since there are only axial and vertical forces –balancing the forces means balancing axial and/or lateral forces.

40. *KSR* said that "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. ... In that instance the fact that a combination was obvious to try might show that

it was obvious...." The fact that applicants as well as others including Ma et al. and Warren are using the same techniques (designing bits using simulations of the bits with earth) to solve the same problem (maximizing drilling production), demonstrates that there are a finite number of predictable solutions (bit designs). Furthermore, there are only a finite number of drill bit parameters – thus there are a finite number of predictable solutions.

41. This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

**42. Any inquiry concerning this communication or earlier communications from the examiner should be:**

directed to: Dr. Hugh Jones telephone number (571) 272-3781,

Monday-Thursday 0830 to 0700 ET,

***or***

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

**mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

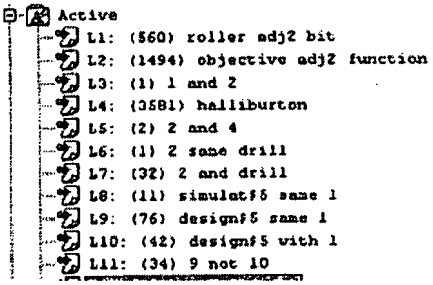
**or faxed to:**

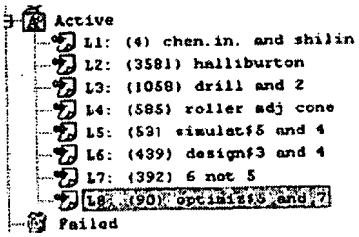
(703) 308-9051 (for formal communications intended for entry)

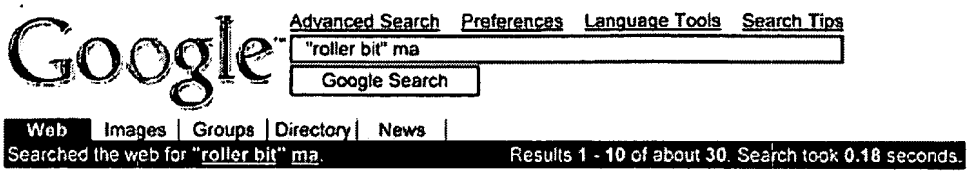
***or*** (703) 308-1396 (for informal or draft communications, please label *PROPOSED* or *DRAFT*).

Dr. Hugh Jones
Primary Patent Examiner
September 27, 2007

HUGH JONES Ph.D.
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100




(PDF) EXPERIMENTAL AND THEORETICAL ANALYSIS OF ROLLER CONE BIT ...
File Format: PDF/Adobe Acrobat - View as HTML
... Several roller bit models has been presented in past. Since cone rotation speed
was assumed to be constant in most of these models (Eronini, 1982, Ma and Azar ...
www.kelly.t.u-tokyo.ac.jp/~naganawa/papers/asme95.pdf - Similar pages

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## 1.105 REQUIREMENT FOR INFORMATION

1. Claims 1-5 of U. S. Application 10/766,228, filed on 1/26/2004 are pending.

2. This action is in response to Applicant's submissions filed 1/26/2004, 9/8/2004, 12/15/2004, 1/31/2005, 5/23/2005, 6/13/2005, 6/29/2005, 3/17/2006, 4/28/2006, 7/11/2006, 8/23/2006, and to Applicant's response of 5/8/2007. This action is also in response to Applicant's interview with the Examiner's supervisor. In the interview, Applicants requested clarification of the requirement. Applicants have also expressed concern about the burden for Applicants to respond to the requirements.

3. The requirement is therefore revised and resent to Applicants. The previous 1.105 requests are hereby **vacated**.

### *Response to Arguments*

4. The required information is reasonably necessary to properly examine the application.

5. Applicant's concerns about burden on Applicants are noted. The 1.105 requirement is revised in order to reduce the burden on Applicants.

6. For these reasons, and in response to Applicant's concerns about burden on Applicants, the requirement for information is revised and resent.

***Requirement for Information***

7. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information (see items A-B) that the examiner has determined is reasonably necessary to the examination of this application:

A. Stipulate for the IDS(s) submitted 1/26/2004, 9/8/2004, 12/15/2004, 1/31/2005, 5/23/2005, 6/13/2005, 6/29/2005, 3/17/2006, 4/28/2006, 7/11/2006, 8/23/2006 the following:

> Identify 10-20 references considered to be most relevant by Applicants and listed on the IDS(s) submitted 1/26/2004, 9/8/2004, 12/15/2004, 1/31/2005, 5/23/2005, 6/13/2005, 6/29/2005, 3/17/2006, 4/28/2006, 7/11/2006, 8/23/2006.
>
> This requirement is deemed to be necessary because a cursory review of the IDS shows a number of references to be completely irrelevant to the subject matter of the claims. For example, with respect to the latest submission on 8/23/2006, consider references I - N. They do not qualify as prior art. No explanation of the relevance or materiality has been provided. In IDS statement filed 9/8/2004, patents issued in 1916, 1918, 1921 almost a *century* ago, are listed. In the IDS statement filed 1/26/2004, there are six patents issued in the 1930's. There also appear to be many cumulative references listed throughout the 11 IDS statements.

B. In order to constitute a complete response Applicant is required to include stipulations for the 10-20 references cited in the IDS submission(s) dated 1/26/2004, 9/8/2004, 12/15/2004, 1/31/2005, 5/23/2005, 6/13/2005, 6/29/2005, 3/17/2006, 4/28/2006, 7/11/2006, 8/23/2006 as well as each and every IDS submission thereafter, as delineated in requirement A.

8. The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this

requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

9. The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

10. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

**11. Any inquiry concerning this communication or earlier communications from the examiner should be:**

directed to: Dr. Hugh Jones telephone number (571) 272-3781,

Monday-Thursday 0830 to 0700 ET,

***or***

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

**mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

(703) 308-9051 (for formal communications intended for entry)

***or*** (703) 308-1396 (for informal or draft communications, please label *PROPOSED* or *DRAFT*).

/Hugh Jones/

Primary Examiner, Art Unit 2128

September 27, 2007

KAMINI SHAH
SUPERVISORY PATENT EXAMINER

HUGH JONES Ph.D.
PRIMARY PATENT EXAMINER
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